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VIA ELECTRONIC FILING *Ex Parte*

July 2, 2012

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: COMMENTS SOUGHT ON DATA SPECIFICATIONS FOR COLLECTING STUDY AREA BOUNDARIES- DA 12-868

Dear Ms. Dortch:

We appreciate the Commission's Public Notice in this docket seeking input on the development of exchange and study area boundaries. The use of a consistent and up to date set of exchange and study area boundaries is a fundamental store of information necessary for effective and fair analysis of broadband deployments as well as the provider landscape.

As an overarching theme, geospatial datasets tend to be complex, difficult to build and costly to maintain. In addition, in any organization, datasets are developed and/or acquired for a particular purpose. A paper exchange map, a CAD plant file or a commercial wirecenter boundary is developed for a particular purpose. Although these datasets may be similar in visual appearance, they are not necessarily interchangeable. As such, our comments are focused toward the development of the boundaries required for a scorched node network cost model.

The intent of this letter is twofold. First as telecommunication network modelers, we want to share knowledge we have gathered working for carriers using their internal geospatial boundaries, manipulating public domain state commission boundaries as well as working with third party licensed boundary products. Second, we want to point out some of the complexities that could be experienced given the proposed data collection plan.

BACKGROUND

CostQuest Associates, Inc. has worked with both private and governmental clients at the local, state, national, and international levels. Based upon these interactions, we have had a wide range of experience with the availability and suitability of data related to communication network geography.

We will first review the potential sources of boundaries and any known issues. We will then provide a definition of the boundaries we believe are needed. Finally, we will discuss some of the issues associated with creating a new public set.

COMMERCIAL BOUNDARIES

Commercial products provide a normalized, consistent source for analytical purposes. However, as public sources there is a cost for acquisition and limits on use that must be considered.

Commercial boundaries focus on the world of the switch engineer. That is, they create and maintain the geographic areas typically served by a location that provides a switching function.

In the figure below, the TomTom (TeleAtlas/TANA) wirecenter boundaries are shown as colored objects. The Central Office (i.e., switch) location within each boundary is a red dot. In the figure, there are some polygons with multiple dots. In these cases, there are multiple switches serving that polygon. This tends to happen with areas that have been consolidated or where, historically, demand exceeded the dominant switch and a remote was deployed. In modeling a scorched node network a dominant switch location would be selected and all demand within the polygon is assumed to be served by the dominant switch point. As you look at the picture, note that there are no overlapping boundaries and that there are no service area gaps (i.e., areas not assigned to a specific switch).

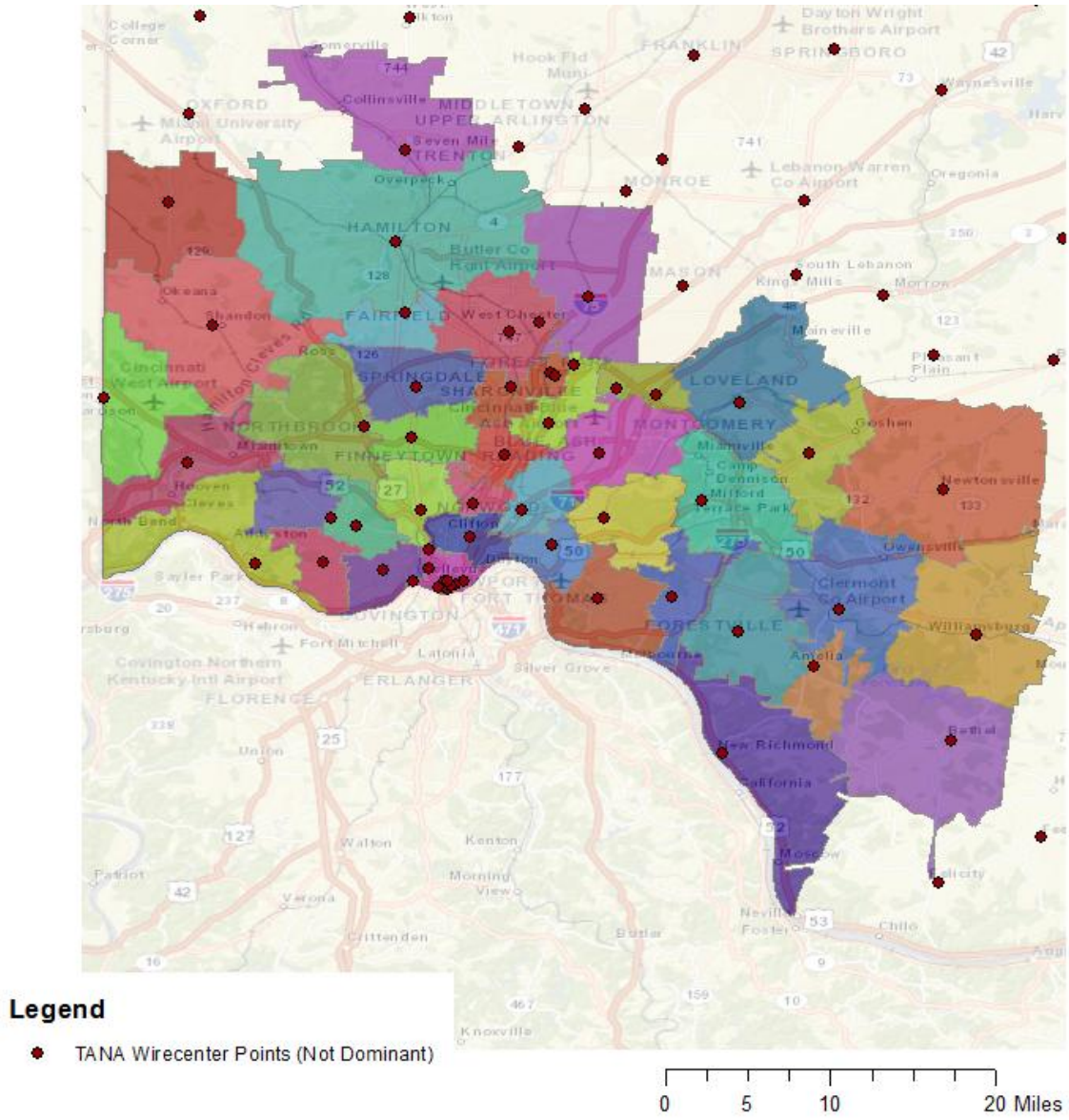

Figure 1-Cincinnati Bell boundaries with all wirecenter points (TomTom/TANA 0610)

In the development of the ABC Coalition model, the Coalition made the decision to use the TeleAtlas boundaries for three reasons. First, it was a uniform data product available to all members. Second, it was consistent with the data product used by the FCC in prior analysis—specifically the National Broadband Plan[1] and geographic analysis tying together USF funding and LEC study areas[2]. Third, the boundaries were similar to those used in prior USF modeling efforts such as the FCC's HCPM.

The implication of these three points is that TeleAtlas was not necessarily chosen as the source of boundaries because of its superior accuracy over another commercial source.

[1] http://download.broadband.gov/plan/the-broadband-availability-gap-obi-technical-paper-no-1.pdf, page 23
[2] http://www.fcc.gov/maps?page=1

Rather it was used because of its availability and consistency with prior analysis. In our opinion, the commercial wirecenter boundary products—for analysis of *non-competitive* LEC areas are very similar. The table below demonstrates the area covered by Price Cap LECs across the three commercial boundary products.[3]

Price Cap LEC	GeoResults AreaSqMi	TomTom (TeleAtlas/TANA) Area Sq Mi, release 0610	PBBI (MapInfo's ExchangeInfo) Area Sq Mi, release 0910
AT&T	622,858	601,301	600,799
CENTURYLINK	694,100	697,849	694,160
VERIZON	193,217	192,440	192,109
FRONTIER COMMUNICATIONS	325,560	323,116	323,728
WINDSTREAM COMMUNICATIONS	159,983	165,812	165,794
FAIRPOINT COMMUNICATIONS	59,564	58,659	58,615
HAWAIIAN TELCOM INC -HI	6,436	6,443	6,443
ACS SYSTEMS, INC	91,300	98,496	98,507
CONSOLIDATED COMMUNICATIONS	5,068	5,011	4,996
CINCINNATI BELL	2,474	2,455	2,455

We are being very careful to not imply that one commercial boundary product is more accurate than another mainly because we are not sure how or what accuracy is measured against. Is the standard for accuracy to be comparability to an exchange area or is the standard of accuracy to be a measure of assignment of network and/or customer nodes in a LEC network?

An additional point of comparison of the commercial boundary products is the licensing terms for use. In recent years, the licensing requirements of some vendors have become more onerous than others. The commercial vendor has a right to protect its data product, but as with anything else, there needs to be a balance between the rights of the vendor and the intended use by the licensee. We find significant difference among the providers in their licensing terms.

[3] When comparing the national datasets we attempted to control boundary names and ownership to make sure the same named polygons were attributed to the same LEC in all three datasets. We were not able to cross verify this across all boundary products. Further the areas measured are at a continental scale and likely a different GIS projection will yield different results although the relative differences will be as shown.

COMPLEXITIES OF EXCHANGE DATA ACQUISITION FROM CARRIERS

Our experience has been that LECs maintain geospatial data in a number of formats. The ease of translation into new formats as well as the degree of maintenance and upkeep are related to the business value implied by the geospatial information.

Our understanding has been that exchange boundaries for most LECs are based upon the original tariff establishing the authority to provide local exchange services. From these exchange areas, carriers deployed their initial facilities. To manage the network, paper based maps were created and maintained by the outside plant groups of the carriers. As time moved forward and new roads were laid and subdivisions and structures were built, these paper maps naturally changed to capture and follow engineering deployments. Over time, many carriers migrated elements from these paper maps to CAD systems. The primary purpose of the CAD systems was to maintain the network and deployment of facilities, not necessarily the legal/tariffed definition of each and every exchange boundary. That said, some LECs have migrated their exchange boundaries into a CAD system others have not.

While the network, landbase and reference data may be maintained by a LEC's network engineering groups in CAD systems, the CAD systems were/are not "friendly" for business and regulatory analytics. True, software does exist that can bridge from CAD formats to ESRI SHP, but the file translation problem is not always a format problem. Rather, it tends to be that CAD data is not always built in a way consistent with geospatial analysis. As an example, polylines may not be closed into polygons, data attributes are not associated with discrete drawing elements, boundaries may not edge-match to a common measure of precision, etc. Moving data from CAD into GIS tends to require a great deal of clean-up.

Further for some providers, CAD information is not always drawn in a manner consistent with geospatial projections. This makes a localized rectification process necessary. As the commission points out, in terms of a paper based process,[4] to provide exchange data in a Geographic Coordinate System, many carriers will still need to undertake a complex rectification process despite the fact that the data are stored digitally. This complex rectification is resource intensive.

Finally, while CAD-GIS interoperability presents major challenges, many carriers have yet to convert entirely to digital system. A great deal of older engineering data is still maintained on paper for many carriers. As such, vector data formats may not exist.

Given the issues and potential costs to create "official" digital exchange boundaries, many carriers actually use commercial products for internal and external purposes. The LECs aren't ignoring the importance of the exchange boundary; they have made a business decision to maintain their network information in one way and maintain their

[4] Comment Sought on Data Specifications for Collecting Study Area Boundaries, WC Docket Nos. 10-90, 05-337,Public Notice, DA 12-868 (Wireline Comp. Bur. rel. June 1, 2012) (Boundary Data PN)., at paragraph 6

boundary information in a different way because each dataset reflects a different need for the business.

STATE EXCHANGE MAPS

While potentially publicly available, not all states maintain digital exchange boundaries and the boundaries may be maintained for purposes that do not line up with the scorched node modeling needs.

As noted above, our understanding has been that exchange boundaries for most LECs are based upon the original state tariffs establishing the authority to provide local exchange services. As pointed out by the Commission,[5] some state authorities maintain this information in geospatial vector formats. More likely, the tariff is typically paper-based and likely the exchange maps or textual legal exchange definitions may not have been updated in a number of years.

There are two key issues with state sources. First, not all states have vector representations of the LEC exchange boundaries. Second, we are not sure the exchange boundaries conform with the Commission's intended use.

As an example, look at the Ohio PUCO published exchange boundaries for the same area depicted in Figure 1 from the commercial boundary products.

[5] Comment Sought on Data Specifications for Collecting Study Area Boundaries, WC Docket Nos. 10-90, 05-337,Public Notice, DA 12-868 (Wireline Comp. Bur. rel. June 1, 2012) (Boundary Data PN)., at paragraph 8

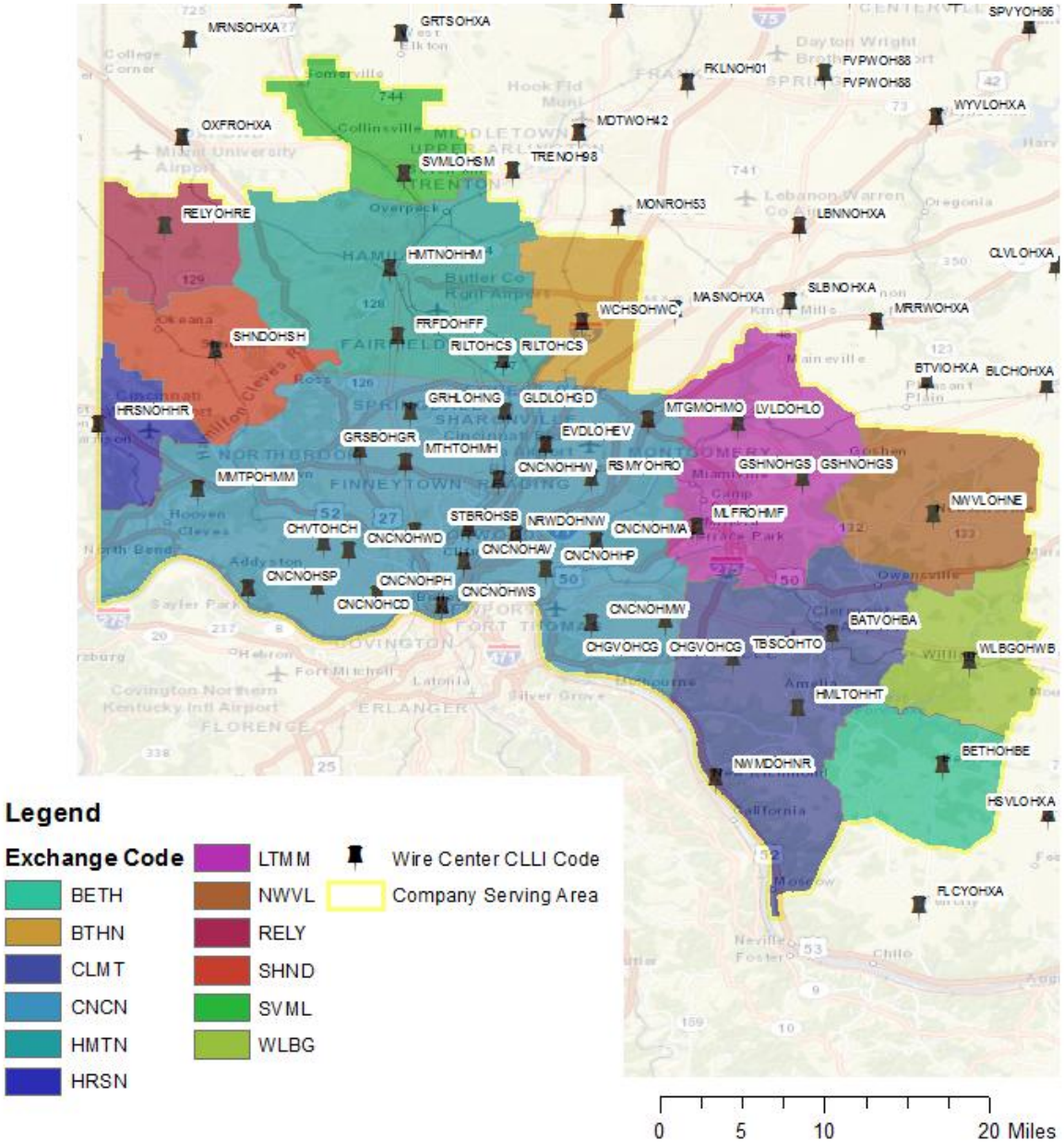

Figure 2-Cincinnati Bell Serving Area, Exchange boundaries all wirecenter points (Ohio PUCO)

The Ohio PUCO boundaries are excellent at illustrating that a state's exchange boundaries can encompass multiple wirecenter points and service areas. In figure 2, there are 12 exchange boundaries, but 44 wirecenter points. One can see that for loop modeling, there is a disconnect between the boundaries and wirecenter locations. Based upon these boundaries, we have no information to show which demand locations in an exchange are served from which network point.

If we turn away from an internally consistent commercial wire center boundary product to a legally derived exchange based dataset, using a single network accessibility point across the entire exchange, the output data from a cost model may begin to imply things

it hasn't before. Based upon figure 2, we could be trying to model broadband service costs with all customers served from a single point in an exchange. In comparison, although the boundaries in figure 1 may not accurately reflect the actual LEC engineering areas, they better capture the scorched node concept.

WHAT IS THE PURPOSE OF THE BOUNDARY?

Exchange boundaries and commercial wirecenter boundaries are geospatial datasets which are developed for different reasons. Most commercial boundaries reflect a measure of accessibility (distance) from the demand point to the primary node in a scorched node design; exchange boundaries represent areas which may be more closely aligned with rate centers.

For the purpose of Universal Service cost modeling, it is important to understand how the boundaries will be used and the location of the node which is serving that boundary.[6] Although an exchange boundary and a wirecenter boundary may look similar and the terms may be used interchangeably, they may not represent the same thing.

The table below provides a basic outline to how most LEC geography is constructed. Admittedly, this table over-simplifies the complexity which has come from changing network deployment patterns, acquisitions, regulatory and tax needs, etc..

	Typical Size	***Geographic Area***
LEC Network Geography	Large (Portions of a State)	USAC Study Areas
		are composed of
	Medium (Portions of Counties)	Exchanges
		are composed of 1 to many
	Portions of a town	Wirecenters
		may be composed of
	Neighborhood	Carrier Serving Areas/Fiber Serving Areas
		may be further composed of
	Cluster of houses	Distribution Areas

Universal Service cost modeling typically starts with a scorched node approach. This implies that the switching function will remain at the point it exists today. Below the switching point, the "loop" plant (the Central Office to the point of demand) is redesigned as it would be deployed today with today's technology and engineering guidelines. If this approach is maintained in the CAF2 modeling, the need for engineering areas (e.g., Carrier Serving Areas) composing the wirecenter are not required

[6] In DA 12-911, WIRELINE COMPETITION BUREAU SEEKS COMMENT ON MODEL DESIGN AND DATA INPUTS FOR PHASE II OF THE CONNECT AMERICA FUND; these scorched node points are shown as Central Offices (Figures 1 and 2)

as they will be redesigned by the cost model. And, the interoffice routing (which connects Central Offices together) may be optimized to capture the latest technology and engineering guidelines. As such, the key datasets which are needed are the wirecenter boundaries and the scorched node which serves them. With this as the defined need, the current commercial products are the closest fit that is currently available.

The key implication for universal service cost modeling is that a boundary linked to a primary scorched node is required.[7] As such, the Commission must be careful in its request and in reviewing the received data to verify the boundaries are appropriate for the intended use. Our sense is that a move away from a commercial wirecenter product to an all exchange[8] view or hybrid exchange/commercial boundary view may introduce some degree of incongruity in the input data because the input polygons were developed to classify different things. As shown in figure 2, an exchange may contain multiple switching points. This happens because an exchange boundary is not necessarily the basis of network engineering. It typically doesn't reflect how a telecommunications network will be built. Rather it reflects how services will be priced. With respect to cost modeling, the use of an exchange boundary seems to imply that there will be a later decision about the singular point from which to develop the scorched node network.

On the other hand, using a wirecenter boundary product and the related wirecenter or dominant switch point within that boundary supports the single boundary to single network origin relationship. It also provides consistency with prior costing approaches.

CONSTRUCTING A USABLE SCORCHED NODE BOUNDARY DATASET

In many cases, especially in densely populated areas, it will be likely for carriers to have overlapping boundaries. In sparsely populated areas network plant may also reach areas outside of exchanges. It will be time consuming to develop a nationwide, uniform process to clarify the overlaps and extensions.

Commercial wirecenter boundary products are internally consistent in that what they tend to illustrate is the spatial extent of LEC service areas from a given service node. In other words, a boundary polygon represents the area which is served from a specific location (or dominant switch). In addition, each point on the earth's surface, within the extent of the geographic coverage of the commercial product, is included in one and only one exchange boundary (as seen in the TANA boundaries in Figure 1).

This explicit one to one relationship is vital in any analysis of network geography. It avoids the issues that could arise as each carrier and/or state submits their own maps. First, the submitted boundaries likely will not show all areas to be covered (which may be

[7] It could be possible to develop a different set of polygons within each exchange that measure accessibility not to existing LEC facilities but to existing broadband served areas. This would imply a scorched earth network design more so than Greenfield design as existing Central Offices or wirecenter points would not be necessary.
[8] It may also be important to clarify what the exchange is. We are not sure if the legal definition and its geographic representation are consistent in meaning across the State's and territories.

acceptable, but the apparent lack of coverage is not a conclusive finding that the area is uncovered). Second, it will be natural for carrier boundaries to overlap. Because the shape of any boundary may impact multiple carriers, how will the Commission settle the ownership of disputed areas and determine the extent of coverage in a timely, uniform manner?

NECESSITY OF ONGOING SUPPORT AND MODIFICATION

Our experience has been that the ongoing maintenance and support costs for a geospatial dataset are close to the initial development costs. The more sources to be combined and the pace at which underlying data changes tends to require more ongoing support.

Finally as with any data product, there needs to be ongoing support and maintenance. With carriers selling exchanges and consolidating operations, it is important to have a mechanism which can track these transactions and make the necessary geospatial modifications.

As the Commission recognizes, building the data product is an impressive amount of work but continuing to maintain, modify and control changes over time will take a comparable amount of effort. If there is a decision to move forward with this data development process, appropriate maintenance and support resources should be budgeted.

CostQuest appreciates the opportunity to provide input as part of the Public Notice. Should you have any questions, please contact me.

Sincerely,

Mark Guttman
CostQuest Associates, Inc.